

AMENDMENTS TO THE SPECIFICATION

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01-EDP-450

TESTING DEVICE FOR DETECTING AND LOCATING ARC FAULTS IN AN ELECTRICAL SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

This application is related to commonly assigned, concurrently filed United States Patent Application Serial No. 10—/091074—, filed March 5, —, 2002, entitled "Low Energy Pulsing Device and Method for Electrical System Arc Detection" (~~Attorney Docket No. 01-EDP-451~~).

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to testing of electrical systems and, more particularly, to devices for arc fault and/or ground fault testing of electrical distribution circuits.

Background Information

The common type of circuit breaker used for residential, commercial, and light industrial applications has an electro-mechanical thermal-magnetic trip device to provide an instantaneous trip in response to a short circuit and a delayed trip in response to persistent overcurrent conditions. Some of these circuit breakers include ground fault protection, which trips the ground fault circuit interrupter (GFCI) in response to a line- to-ground fault, and in some cases, a neutral-to-ground fault. Ground fault protection is provided by an electronic circuit which is set to trip at about 4 to 6 mA of ground fault current for people protection, and at about 30 mA for equipment protection. It is known to incorporate a test circuit in the circuit breaker, which tests at least portions of the electronic ground fault trip circuit. It is also known to test for proper wiring connections. Test circuits for this purpose are commercially available.

Recently, there has been rising interest in also protecting such power distribution circuits, and particularly the branch circuits for homes, commercial and light industrial applications, from arcing faults. Arcing faults are intermittent, high impedance faults, which can be caused for instance by worn or damaged insulation, loose connections, broken conductors and the like. Arcing faults can occur in the permanent wiring, at receptacles, or more likely, in the wiring of loads or extension

responsive signal, and means for annunciating the responsive signal when the means for detecting is proximate the arcing fault.

BRIEF DESCRIPTION OF THE DRAWINGS

A full understanding of the invention can be gained from the following description of the preferred embodiments when read in conjunction with the accompanying drawings in which:

Figure 1 is a block diagram of a system including a pulsing device, which generates relatively low energy, low duty cycle pulses for arc fault testing, and an arc fault locating and testing device in accordance with the present invention.

Figure 2 is a block diagram of the arc fault locating and testing device of Figure 1.

Figure 3 is a block diagram in schematic form of the pulsing device of Figure 1.

Figure 4 is a block diagram of an arc fault locator circuit of the testing device of Figure 2 including an antenna for receiving a radio frequency signal and a radio frequency detector for detecting the received radio frequency signal.

Figure 5 is a block diagram of various fault test circuits of the testing device of Figure 2.

Figure 6 is a block diagram of a wire locating circuit and a removable tone generating circuit of the testing device of Figure 2.

Figure 7 is a block diagram of a detector circuit including audio and ultrasonic pick-up coils and audio and ultrasonic detectors for an arc fault locating and testing device in accordance with another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention is preferably used in combination with a suitable pulsing device such as disclosed in commonly assigned, concurrently filed Application Serial No.

10____/091,074_____, filed March 5_____, 2002, entitled "Low Energy Pulsing Device and Method for Electrical System Arc Detection" (~~Attorney Docket No. 01-EDP-451~~).

Referring to Figure 1, the exemplary pulsing device 2 produces a suitable periodic arcing signal 4, in order to locate and detect an intermittent arcing